Abalone Survey in the Estevan Group and Aristazabal Island May, 1983

J. A. Boutillier, W. Carolsfeld, P. A. Breen, and K. Bates

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

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ABALONE SURVEY IN THE ESTEVAN GROUP AND ARISTAZABAL ISLAND MAY, 1983

by

J. A. Boutillier, W. Carolsfeld, P. A. Breen, and K. Bates[1]

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, B.C. V9R 5K6

[1]Present Address: Dept. of Fisheries and Oceans
Field Services Branch
Federal Building, Room 117
417 2nd Ave. West
Prince Rupert, B. C. V8J 1G8

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ABSTRACT

Boutillier, J. A., W. Carolsfeld, P. A. Breen, and K. Bates. 1984. Abalone survey in the Estevan Group and Aristazabal Island, May 1983. Can. MS Rep. Fish. Aquat. Sci. 1747: iv + 60 p.

This survey was conducted to determine whether northern abalone (Haliotis kamtschatkana) abundance had declined on a part of the British Columbia, Canada, coast. A team of two biologists and a commercial abalone diver measured abalone abundance at 42 sites in the Estevan Group and along the west coast of Aristazabal Island, on the north coast of British Columbia, in May 1983. Overall abalone density had declined, abundance of legal sized abalone had decreased, and pre-recruits were less numerous than during previous surveys in 1979 and 1980. A direct comparison of density at eleven previously surveyed sites showed that the decrease in legal size abalone abundance was significant. The decrease appeared to be 45-55%. A comparison of sites selected by fisheries personnel and commercial fishermen indicated that there was no bias in site selection for the purposes of this comparison.

Key Words: abalone, Haliotis, abundance, British Columbia.

RÉSUMÉ

Boutillier, J. A., W. Carolsfeld, P. A. Breen, and K. Bates. 1984. Abalone survey in the Estevan Group and Aristazabal Island, May 1983. Can. MS Rep. Fish. Aquat. Sci. 1747: iv + 60 p.

Le présent inventaire a été effectué afin de déterminer s'il y avait eu baisse de l'abondance de l'haliotide pie (Haliotis kamtschatkana) dans une partie de la côte de la Colombie-Britannique (Canada). Deux biologistes et un plongeur professionnel de la pêche de l'haliotide formant équipe ont déterminé en mai 1983 l'abondance de ce mollusque en 42 endroits du groupe des îles Estevan et le long de la côte ouest de l'île Aristazabal (côte nord de la Colombie-Britannique). La densité générale avait décliné de même que l'abondance des haliotides de taille légale et le nombre d'individus formant le pré-recrutement était inférieur à ceux notés lors des inventaires de 1979 et 1980. La comparaison directe des densités en onze endroits déjà inventoriés a montré un déclin significatif de l'abondance des haliotides de taille légale. La diminution semblait être de 45 à 55%. La comparaison des endroits choisis par le personnel des pêches et les pêcheurs commerciaux a montré l'absence de biais quant au choix des endroits.

Mots clés: haliotide, Haliotis, abondance, Colombie-Britannique

INTRODUCTION

Northern abalone (Haliotis kamtschatkana) has supported a valuable shellfish fishery in British Columbia since 1976 (see Fedorenko and Sprout 1982). Beginning in 1979, the fishery has been regulated by an annual quota, based on the results of Breen (1980) and subsequent work (Breen and Adkins 1981, 1982).

The survey reported here was conducted because of concerns about the impact of the present catch quota on abalone stocks. In mid 1979 an annual catch quota of 113.4 mt was set at the estimated equilibrium catch level suggested by Breen (1980). The quota subsequently decreased in stages to 58.2 mt in 1983 because of additional concerns; a number of indicators suggest declining abalone stocks since 1979. These include declining catch/unit effort reported on fishermen's logsheets (K. Bates, unpub. data), shifting fishing patterns, and anecdotal information from fishermen and fishery officers. As a result of these concerns, a survey involving Field and Resource Services Branches, and an experienced commercial fisherman was designed to measure abalone abundance in Fisheries Statistical Area 6.

Area 6 (see Fig 1) is one of several major abalone producing areas on the B.C. coast. Abalone catches for this area from mid-1979 to the end of 1982 totalled 158.5 tonnes.

The survey was designed with several objects in mind. First, since a number of locations had been previously examined quantitatively and could be re-located, the survey compared present abundance with past abundance at these sites. Second, the survey examined abundance in other locations, using the same procedures upon which previous estimates were based. Third, because commercial fishermen profess reservations about the ability of biologists to survey abalone populations, the present survey was designed to compare abalone abundance at sites founds by biologists and a fisherman.

METHODS

The survey was conducted by Wolfgang Carolsfeld (Fisheries Research Branch), Kevin Bates (Field Services Branch), and Rob Harrington, a commercial abalone license holder. The commercial diver was chosen by calling tenders. The survey used Mr. Harrington's vessel and the patrol vessels Kitimat II and Babine Post.

The general areas surveyed were the west and south portions of the Estevan Group, areas close to Borrowman Bay at the northwest part of Aristazabal Island, Weeteeam Bay on the southwest part of Aristazabal Island, and the southern tip of Aristazabal Island.

In carrying out site selection the biologists chose half the sites and the commercial fisherman chose the other half. Biologists made their choice first from a list of exact locations which had previously been measured, then from general areas previously surveyed. Previous surveys relevant to this study are described by Breen & Adkins (1980, 1981, 1982). The site selection process relied on field notes written by previous workers, which contain landmarks and in some cases bearings and photographs of sampling locations. It was not possible to relocate sites with an accuracy greater than 100 m, partly because the divers involved were not the same. The commercial license holder chose locations that best represented areas where he would look to harvest abalone based on his experience, knowledge of the areas, and local features.

Because the survey was attempting to duplicate previous work as closely as possible, all sites were chosen from the surface; they were not chosen after direct underwater observation.

At each site, divers followed the procedure described by Breen & Adkins (1979). The topography, substrate type, exposure and dominant algae were visually identified or estimated and recorded on waterproof paper. Abalone density was measured within a square metal quadrat of 1 m^2, placed on the bottom in a 16-quadrat pattern using a standard procedure. The first quadrat sample was taken at the minimum depth at which abalone were observed during the first swim upslope from the dive entry point. Transects ran downslope except on flat bottom, where transects ran at right angles to the kelp bed edge. The first quadrat was placed at the same depth as, but 5 m from, the point where divers observed the minimum depth of abalone distribution. The second to fourth quadrats were deeper, each separated by 1m; three similar transects were each separated by 4 m.

Within each quadrat, all large kelp plants were cut or removed. Abalone were counted and then collected. All moveable rocks within the quadrat were turned over and replaced during the search for abalone. Shell lengths of abalone were measured later to the nearest mm, rounding down. At two sites, the quadrat work was abandoned after no abalone had been found in the first 8 quadrats. Other invertebrates were noted if they were abundant, especially red sea urchins (Strongylocentrotus franciscanus). The algal community structure was described in the manner used in previous surveys. Algal dominants were identified visually, and their percent cover estimated visually, in four levels: the overhead canopy of floating kelps, the undercanopy, the turf and the encrusting algae. Depths were recorded from divers' depth gauges (calibrated against a leadline) and corrected to depth below chart datum by subtracting the interpolated tide height.

RESULTS

Forty-two dives were made in the area from Oswald Bay to Weeteeam Bay. The station sheets, which describe the sites in some detail, are given as Appendix 1. Locations of some sites involve confidential information

provided by license holders; therefore the exact positions of these sites are not reported. Summaries of abalone densities observed at the sites are shown in Table 1. Abalone were found at all but two sites. At the 40 remaining sites, legal-sized abalone were found at thirty-two sites, seven sites had no legal abalone, and work at one site was aborted halfway through because of poor diving conditions.

Abalone density

The table below shows the number of quadrats sampled and the numbers of abalone observed during this survey. This table only included those sites at which legal abalone were found. For comparison, the corresponding observations were tabulated from similar work carried out in the same areas in 1979 and 1980. Sites from those studies were included which were in the same areas covered during this study and which had legal sized abalone. Because the minimum legal size limit was changed from 4 inches to 100 mm between the two periods, the data from 1979-80 were re-tabulated, including as legal abalone all those with lengths of 100 mm or greater.

Numbers of abalone and legal abalone found during this survey and in 1979-80.

Survey	# quadrats m^2	# abalone	s^2	# legal abalone	overall density #/m^2	legal density #/m2	% legal
1983	512	977	9.75	161	1.91	0.31	16.5
1979-80	817	2236	9.56	530	2.74	0.65	23.7
% change					-30.3	-52.3	

The decline in overall abalone abundance was statistically significant (Student's $t=4.40$, $P<0.05$), as was the reduction in the proportion of legal abalone (chi square = 42.99, $P<0.05$); thus the apparent decline in legal abalone density of 52% probably reflects a real decline.

The proportion of percentage of legal sized abalone can be used to make an independent estimate of change in abundance (Breen 1980). Using that method and its assumptions, the decline shown in the table above would reflect a decrease in legal abundance of 36% and hence a decline in overall abundance of 8%. The main assumption of this method is that abundance of sublegal abalone does not change. Since the table above indicates a larger decrease in both overall and legal abundance, the use of this method results in an under-estimate of the decrease in legal abalone abundance.

At eleven sites, density measured on this survey can be compared with that found in 1979-80. The following table shows density at these sites at two times.

1983 site	1979-80 site	legal density (#/m²) 1983	1979-80	change
83-13	79-27	0.06	0.48	decrease
83-15	79-12	0.25	0.27	decrease
83-17	79-14	0.00	0.21	decrease
83-19	79-11	0.44	0.55	decrease
83-21	79-18	0.44	0.84	decrease
83-22	79-20	0.31	0.23	increase
83-23	79-08	0.25	0.78	decrease
83-24	79-09	0.00	0.27	decrease
83-25	80-70	0.38	0.44	decrease
83-27	80-06	0.13	0.13	no change
83-36	80-07	0.13	1.16	decrease
mean		0.22	0.49	45% decrease

This set of comparisons was tested with a sign test. The null hypothesis that there had been no real change was rejected ($P<0.05$). Thus abalone have declined significantly at these 11 sites, by an average of 45%.

Recruitment

Recruitment to the fishery was previously examined (Breen 1980, Breen & Adkins 1981) by determining the density of two groups: those abalone likely to recruit to the fishery within a year, and those which had likely recruited within the past year. The groups were determined on the basis of size, in turn based on studies of growth. The same procedure was carried out on abalone measured in this survey, using the same sizes as in the previous study, and are given in the table below. For comparison, the table also shows the density of abalone in the same groups at 1979-80 sites at which legal abalone were found.

Survey	Abalone density (#/m²) 94-101 mm	102-107 mm
1983	0.23	0.11
1979-80	0.46	0.25
% change	-50.0	-56.0

The density of both pre-recruits and new recruits has apparently decreased by about half.

Sizes of abalone collected from the major areas of this survey are shown in Figs 2-5. Few juveniles (individuals <50 mm) were observed in any area.

Effect of site selection

The study was designed so that sites selected by biologists could be compared with sites selected by a commercial fisherman. Using the procedure described above, each chose 21 sites. The numbers of sites with abalone and legal abalone are shown below.

Site selection	sites without abalone aborted	sites with abalone aborted	sites with abalone	sites with legal abalone
Biologists	0	1	20	13
Fisherman	2	0	19	19

This table indicates that both divers were efficient at finding sites with abalone, but that the fisherman found more sites with legal sized abalone. In the analysis of those sites with legal abalone there was no significant difference in legal abalone abundance between the two groups of sites (Mann-Whitney U=111.5, P>0.05). The mean legal densities found by the biologist and fisherman respectively were 0.31 and 0.33/m^2.

DISCUSSION

From 1979-80 to May 1983, abalone abundance showed a significant decline in the area surveyed. This decline affected legal abalone and pre-recruits as well as overall abundance. Overall, the decline appeared to be 30%. Legal abundance apparently declined by 45-55%.

The 1983 survey attempted to operate in the same areas as the previous work. It was not possible to sample the various sub-areas with exactly identical relative efforts because of the way that previous work was organized. However, the 1983 survey used a rigid technique designed to mimic the performance of previous workers. Results can, we believe, be fairly compared to the 1979-80 results. This belief is supported by the results obtained at eleven sites where re-surveys were made of exact locations. There this survey encountered lower densities at 9/11 sites, and the change in mean legal density agreed with results from the total survey.

The continuing decline in abalone abundance could have been caused by a number of factors. These include: local over-fishing, sub-legal mortality caused by the fishery, habitat changes caused by the fishery, and recuitment failure. Results above show decreased pre-recruit density abundance and a scarcity of juveniles, suggesting problems with recruitment. If recruitment is in fact failing, this may be a stock-recruit phenomenon or alternatively an environmental effect. Area 6 has supported a somewhat higher proportion of the total catch in relation to its size. Thus, local

over-fishing may have occurred.

It would be premature to extrapolate results of this survey to the coast as a whole, as fishing effort has not been evenly distributed over the coast. As pointed out above, Area 6 has received more effort than other areas over the period 1980-1983. Because of this, it may be that other areas have increased in abalone abundance after enjoying relatively low effort. Alternatively, since the fleet is free to operate anywhere, higher effort and catches in Area 6 may reflect higher stock levels relative to other areas. We therefore recommend that a survey similar to this be carried out as soon as possible in other areas where previous survey information is available.

If stock declines since 1980 are found to be general, then the quotas assigned since 1980 were obviously too high. This could be the result of failure of the several assumptions described and discussed by Breen (1980) and Breen and Adkins (1981, 1982). Since the stock in 1978 was estimated to have declined by 60-75% from its pre-fishery level, a general decline of 50% (as observed in Area 6) would imply that present stocks were only 15-20% of pre-fishery levels. If that were the case, serious consideration would have to be given to rehabilitation mechanisms, such as closing the fishery. This is especially important in light of the observed decline in recruitment in Area 6.

ACKNOWLEDGMENTS

The authors wish to thank Rob and Elizabeth Harrington for their help, interest and advice on this project; and the captains and crews of the patrol vessels KITIMAT II and BABINE POST. Susan Farlinger and Neil Bourne provided valuable comments on the manuscript.

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Table 1. Summary of abalone numbers observed during the survey. In site selection, B indicates that biologists chose the site, F indicates the fisherman chose the site.

Station no.	No. quadrats	No. abalone	No. legal abalone	Site selection
83-02	16	3	0	B
83-03	16	13	0	B
83-04	8	8	4	B
83-05	16	0	0	F
83-06	16	17	0	B
83-07	8	20	0	B
83-08	16	37	6	F
83-09	16	14	0	B
83-10	16	16	3	F
83-11	16	13	1	F
83-12	16	11	4	F
83-13	16	9	1	B
83-14	16	33	2	F
83-15	16	17	4	B
83-16	16	6	1	B
83-17	16	28	0	B
83-18	8	0	0	F
83-19	16	17	7	B
83-20	16	6	5	F
83-21	16	23	7	B
83-22	16	10	5	B
83-23	16	41	4	B
83-24	16	11	0	B
83-25	16	28	6	B
83-26	16	169	13	F
83-27	16	6	2	B
83-28	16	25	9	F
83-29	16	33	5	F
83-30	16	75	15	F
83-31	16	19	5	F
83-32	16	62	8	F
83-33	16	28	3	F
83-34	16	38	5	F
83-35	16	53	3	F
83-36	16	26	2	B
83-37	16	39	3	F
83-38	16	37	5	F
83-39	16	68	18	B
83-40	16	10	2	F
83-41	16	15	0	B
83-42	16	6	1	F
83-43	16	8	2	B

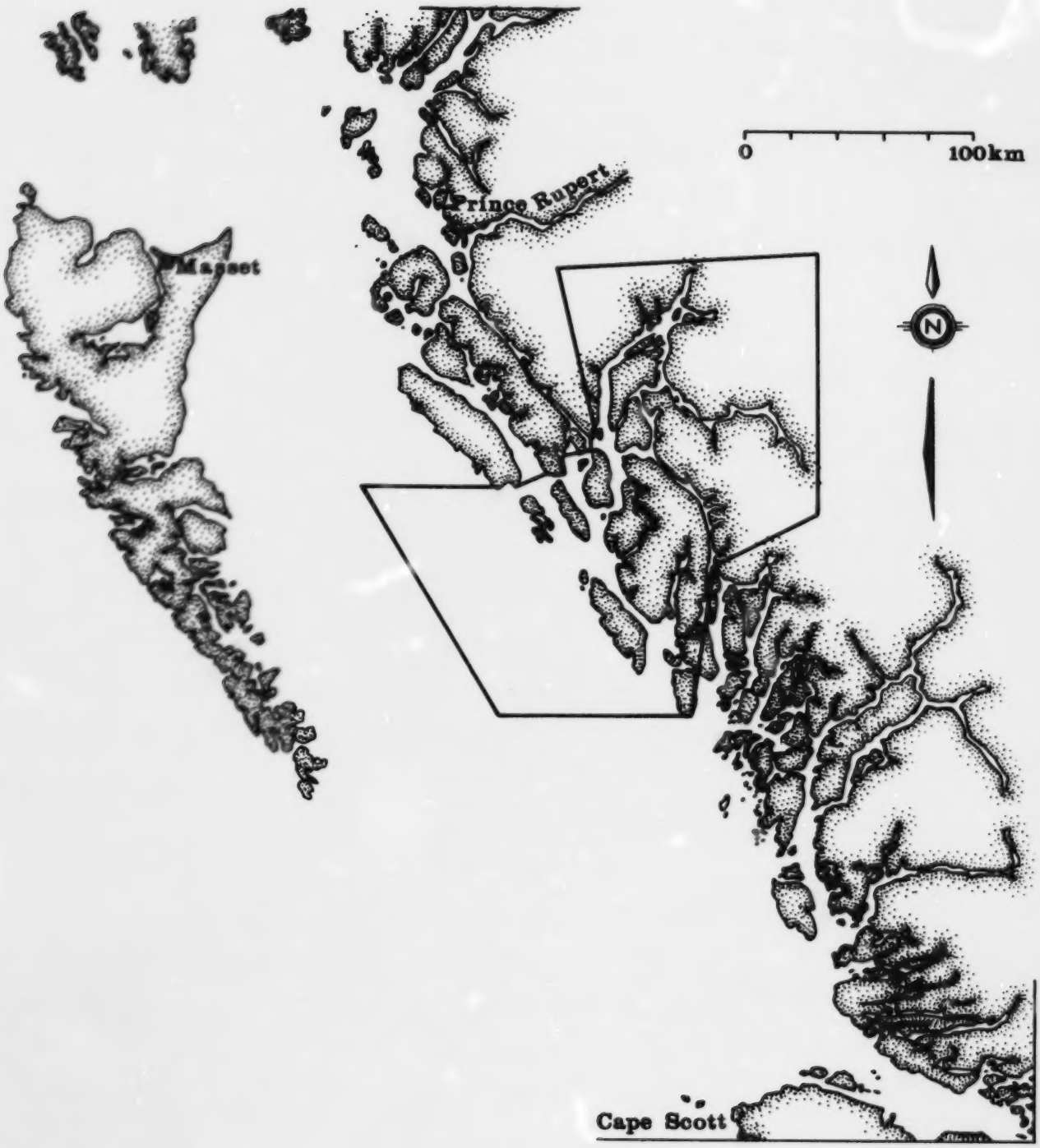

Fig. 1. Fisheries Statistical Area 6.

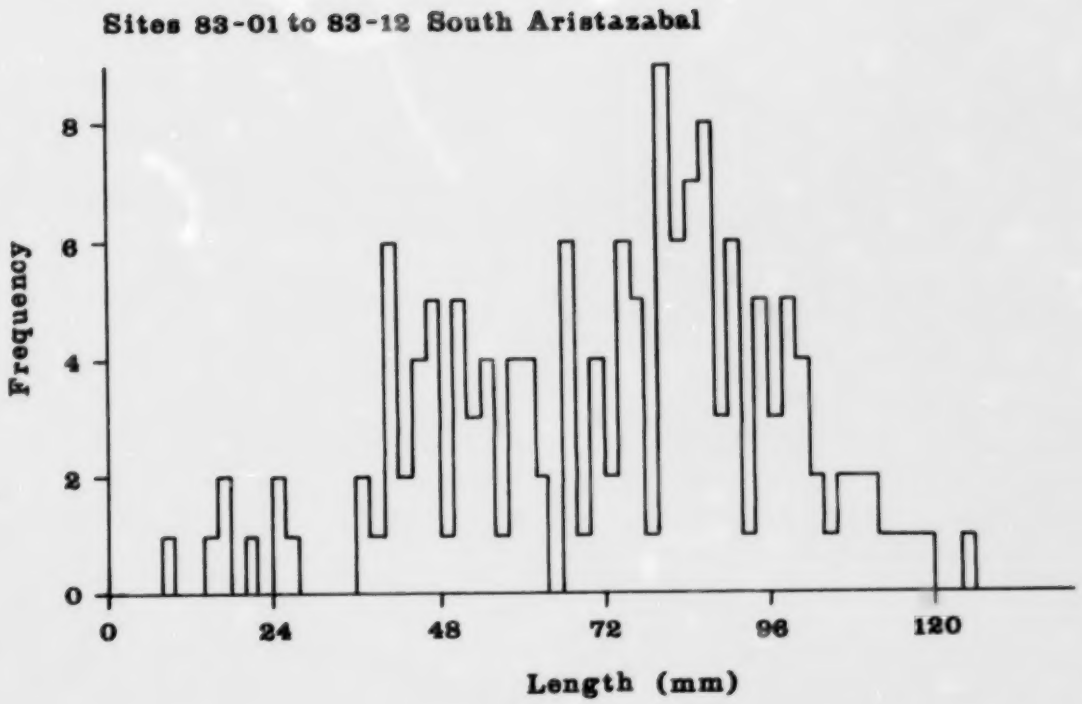

Fig. 2. Length frequencies of abalone collected at sites 01 - 12.

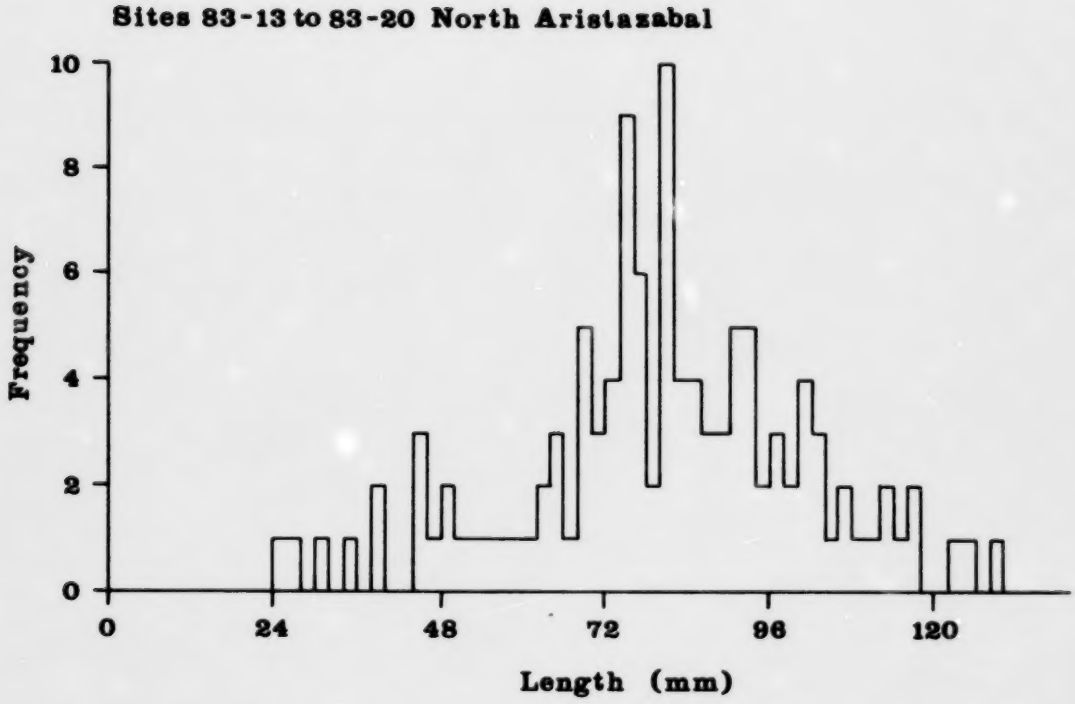

Fig. 3. Length frequencies of abalone collected at sites 13 - 20.

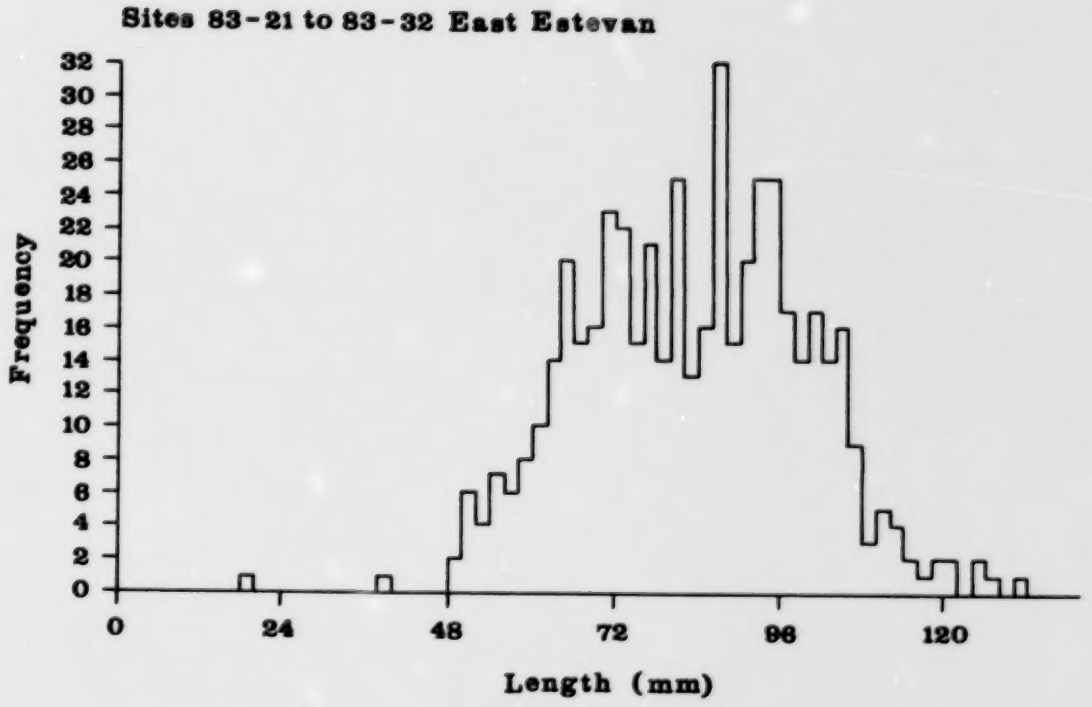

Fig. 4. Length frequencies of abalone collected at sites 21 - 32.

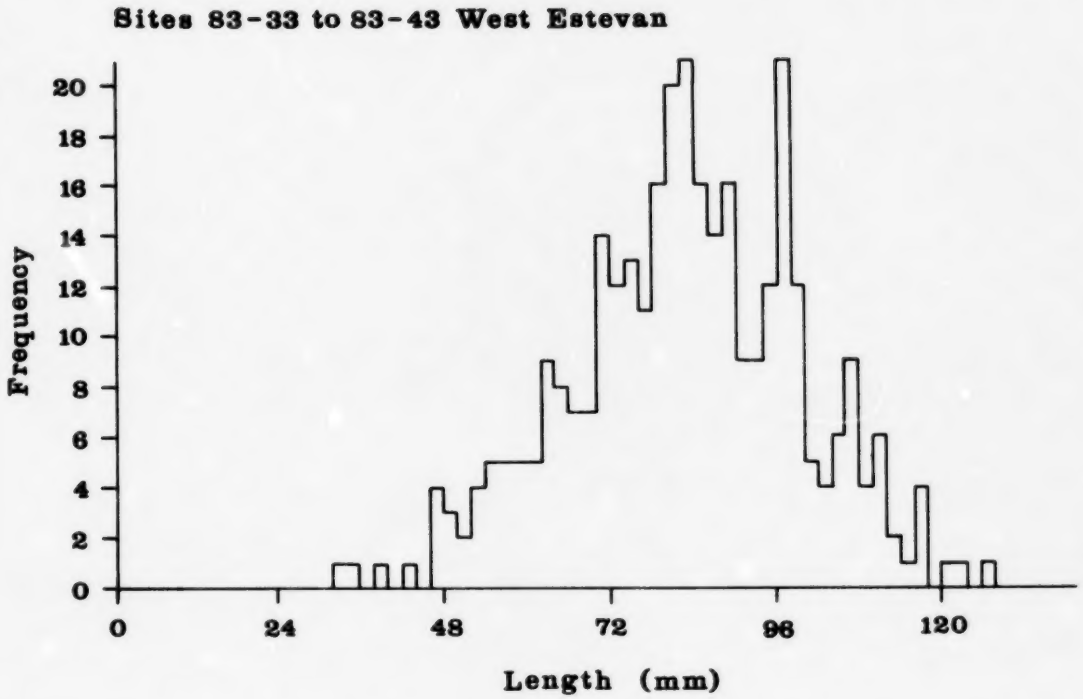

Fig. 5. Length frequencies of abalone collected at sites 33 - 43.

Appendix 1

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 002 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Weeteeam Bay

1983 MAY 18 (PST) TIME:START: 10:55 FINISH: 11:25

DEPTH FROM DATUM: MAX: 1.5 meters TIDE START: 1.5 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL. SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Costaria sp.	10	!	Alaria sp.	10
TURF	Brown algae -cylindrical	00	!	--	0
ROCKS	Lithothamnion sp.	90	!	articulated corallines	10

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.5	1	0
ABALONE	.	2	0
ABALONE	.	3	0
ABALONE	1.5	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	1
ABALONE	.	8	1
ABALONE	.	9	1
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	0
ABALONE	.	14	0
ABALONE	.	15	1
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	20 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 003 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Weeteeam Bay

1983 MAY 18 (PST) TIME:START: 11:43 FINISH: 12:11

DEPTH FROM DATUM: MAX: 5.4 meters TIDE START: 1.3 meters

EXPOSURE: Ground Swell Normal SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(CRV) SLOPE: 60 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	--	0	--	0
BOTTOM	Laminaria sp.	10	Phyllospadix sp.	10
TURF	--	0	--	0
ROCKS	Lithothamnion sp.	90	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	1.8	1	1
ABALONE	.	2	0
ABALONE	.	3	0
ABALONE	5.4	4	0
ABALONE	.	5	0
ABALONE	.	6	1
ABALONE	.	7	3
ABALONE	.	8	0
ABALONE	.	9	3
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	1
ABALONE	.	13	4
ABALONE	.	14	0
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	10 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 004 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Weeteeam Bay

1983 MAY 18 (PST) TIME:START: 14:10 FINISH: 14:43

DEPTH FROM DATUM: MAX: 1.0 meters TIDE START: 1.6 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL./SND./SHL. SLOPE: 10 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Egregia menziesii	10	!	Desmarestia sp.	10
TURF	articulated corallines	10	!	--	0
ROCKS	Lithothamnion sp.	90	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.6	1	2
ABALONE	.	2	2
ABALONE	.	3	1
ABALONE	1.0	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	0
ABALONE	.	11	1
ABALONE	.	12	1
ABALONE	.	13	0
ABALONE	.	14	0
ABALONE	.	15	1
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 005 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Weeteeam Bay

1983 MAY 18 (PST) TIME:START: 15:05 FINISH: 15:17

DEPTH FROM DATUM: MAX: 1.2 meters TIDE START: 1.7 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: CBL./GRV. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	--	0	--	0
BOTTOM	--	0	--	0
TURF	--	0	--	0
ROCKS	Lithothamnion sp.	80	--	0

REMARKS: Aborted - Target Species Absent

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	1.2	1	0
ABALONE	1.2	2	0
ABALONE	1.2	3	0
ABALONE	1.2	4	0
ABALONE	1.2	5	0
ABALONE	1.2	6	0
ABALONE	1.2	7	0
ABALONE	1.2	8	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 006 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Weeteeam Bay

1983 MAY 18 (PST) TIME:START: 15:27 FINISH: 16:12

DEPTH FROM DATUM: MAX: 3.0 meters TIDE START: 2.2 meters

EXPOSURE: Ground Swell Normal SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL. SLOPE: 40 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Laminaria sp.	10	!	--	0
TURF	articulated corallines	20	!	--	0
ROCKS	Lithothamnion sp.	80	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.4	1	0
ABALONE	.	2	0
ABALONE	.	3	1
ABALONE	3.0	4	1
ABALONE	.	5	3
ABALONE	.	6	1
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	6
ABALONE	.	14	2
ABALONE	.	15	3
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	10 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 007 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Weeteeam Bay

1983 MAY 19 (PST) TIME:START: 09:17 FINISH: 09:40

DEPTH FROM DATUM: MAX: 4.5 meters TIDE START: 2.5 meters

EXPOSURE: Ground Swell Normal SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 60 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Laminaria sp.	00	!	--	0
TURF	--	0	!	--	0
ROCKS	Lithothamnion sp.	90	!	articulated corallines	10

REMARKS: Aborted - Bad Diving Conditions

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	.5	1	8
ABALONE	.	2	3
ABALONE	.	3	3
ABALONE	4.5	4	1
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	5
ABALONE	.	8	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 008 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Weeteeam Bay

1983 MAY 19 (PST) TIME:START: 10:23 FINISH: 11:05

DEPTH FROM DATUM: MAX: 2.0 meters TIDE START: 2.3 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	10	!	--	0
BOTTOM	Egregia menziesii	00	!	Costaria sp.	00
TURF	Red algae - filamentous	10	!	Brown algae -cylindrical	10
ROCKS	Lithothamnion sp.	90	!	articulated corallines	10

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.5	1	11
ABALONE	.	2	1
ABALONE	.	3	4
ABALONE	2.0	4	0
ABALONE	-0.5	5	14
ABALONE	.	6	4
ABALONE	.	7	1
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	0
ABALONE	.	11	1
ABALONE	.	12	0
ABALONE	.	13	1
ABALONE	.	14	0
ABALONE	.	15	0
ABALONE	2.0	16	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 009 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Weeteeam Bay

1983 MAY 20 (PST) TIME:START: 08:38 FINISH: 09:45

DEPTH FROM DATUM: MAX: 1.5 meters TIDE START: 3.7 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BLD./CBL./GRV./SHL. SLOPE: 10 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	60	--	0
BOTTOM	Laminaria sp.	20	Phyllospadix sp.	10
TURF	articulated corallines	80	--	0
ROCKS	Lithothamnion sp.	50	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	.5	1	0
ABALONE	.	2	0
ABALONE	.	3	2
ABALONE	1.5	4	2
ABALONE	.	5	0
ABALONE	.	6	4
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	1
ABALONE	.	10	2
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	2
ABALONE	.	14	1
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	4	80 *
SEA URCHIN (PURPLE)	.	4	3 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 010 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Prior Passage

1983 MAY 21 (PST) TIME:START: 09:27 FINISH: 10:32

DEPTH FROM DATUM: MAX: 2.6 meters TIDE START: 1.4 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./BLD. SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Alaria sp.	10	!	Laminaria sp.	10
TURF	articulated corallines	10	!	--	0
ROCKS	Lithothamnion sp.	70	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	1.3	1	0
ABALONE	.	2	0
ABALONE	.	3	5
ABALONE	2.6	4	2
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	2
ABALONE	.	8	1
ABALONE	.	9	0
ABALONE	.	10	1
ABALONE	.	11	1
ABALONE	.	12	0
ABALONE	.	13	1
ABALONE	.	14	1
ABALONE	.	15	2
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	10 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 011 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Prior Passage

1983 MAY 21 (PST) TIME:START: 10:57 FINISH: 11:57

DEPTH FROM DATUM: MAX: 2.4 meters TIDE START: 1.7 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL. SLOPE: 10 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Alaria sp.	10	!	Costaria sp.	10
TURF	articulated corallines	10	!	--	0
ROCKS	Lithothamnion sp.	60	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	1.0	1	0
ABALONE	.	2	3
ABALONE	.	3	5
ABALONE	2.4	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	0
ABALONE	.	11	1
ABALONE	.	12	0
ABALONE	.	13	2
ABALONE	.	14	2
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	15 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 012 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Prior Passage

1983 MAY 21 (PST) TIME:START: 13:20 FINISH: 14:20

DEPTH FROM DATUM: MAX: 0.9 meters TIDE START: 3.1 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./BLD. SLOPE: 30 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Egregia menziesii	10	!	Desmarestia sp.	10
TURF	articulated corallines	10	!	--	0
ROCKS	Lithothamnion sp.	80	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-2.1	1	1
ABALONE	.	2	0
ABALONE	.	3	4
ABALONE	.9	4	0
ABALONE	.	5	0
ABALONE	.	6	1
ABALONE	.	7	0
ABALONE	.	8	1
ABALONE	.	9	1
ABALONE	.	10	1
ABALONE	.	11	0
ABALONE	.	12	1
ABALONE	.	13	0
ABALONE	.	14	1
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 013 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Anderson Islets

1983 MAY 22 (PST) TIME:START: 09:40 FINISH: 10:42

DEPTH FROM DATUM: MAX: 2.3 meters TIDE START: 3.8 meters

EXPOSURE: Occasional Current SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./BLD. SLOPE: 40 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Costaria sp.	10	!	Nereocystis luetkeana	10
TURF	articulated corallines	10	!	Green algae-filamentous	10
ROCKS	Lithothamnion sp.	50	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.1	1	0
ABALONE	.	2	2
ABALONE	.	3	0
ABALONE	2.3	4	1
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	3
ABALONE	.	9	2
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	0
ABALONE	.	14	1
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 014 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Anderson Islets

1983 MAY 22 (PST) TIME:START: 11:10 FINISH: 12:15

DEPTH FROM DATUM: MAX: 2.2 meters TIDE START: 3.9 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL./SND./SHL. SLOPE: 30 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Laminaria sp.	40	!	Nereocystis luetkeana	10
TURF	Green algae-filamentous	10	!	Ulva sp.	10
ROCKS	Lithothamnion sp.	20	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.2	1	5
ABALONE	.	2	1
ABALONE	.	3	0
ABALONE	2.2	4	0
ABALONE	.	5	2
ABALONE	.	6	1
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	8
ABALONE	.	10	0
ABALONE	.	11	2
ABALONE	.	12	0
ABALONE	.	13	3
ABALONE	.	14	8
ABALONE	.	15	2
ABALONE	.	16	1
SEA URCHIN (RED)	.	99	3 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 015 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Anderson Islets

1983 MAY 22 (PST) TIME:START: 13:26 FINISH: 14:12

DEPTH FROM DATUM: MAX: 0.7 meters TIDE START: 2.7 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL. SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	--	10	!	Nereocystis luetkeana	10
TURF	articulated corallines	10	!	--	0
ROCKS	Lithothamnion sp.	10	!	Lithothamnion sp.	20

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.2	1	1
ABALONE	.	2	2
ABALONE	.	3	1
ABALONE	.7	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	2
ABALONE	.	8	0
ABALONE	.	9	1
ABALONE	.	10	1
ABALONE	.	11	1
ABALONE	.	12	2
ABALONE	.	13	0
ABALONE	.	14	3
ABALONE	.	15	2
ABALONE	.	16	1
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 016 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Anderson Islets

1983 MAY 22 (PST) TIME:START: 14:41 FINISH: 15:25

DEPTH FROM DATUM: MAX: 1.7 meters TIDE START: 1.7 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL. SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Nereocystis luetkeana	10	!	Alaria sp.	10
TURF	articulated corallines	10	!	Green algae-filamentous	10
ROCKS	Lithothamnion sp.	30	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.1	1	0
ABALONE	.	2	2
ABALONE	.	3	0
ABALONE	1.7	4	0
ABALONE	.	5	3
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	0
ABALONE	.	14	0
ABALONE	.	15	1
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 017 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Borrowman Bay

1983 MAY 23 (PST) TIME:START: 09:57 FINISH: 10:47

DEPTH FROM DATUM: MAX: 1.9 meters TIDE START: 3.3 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL. SLOPE: 30 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Hedophyllum sessile	10	!	Costaria sp.	10
TURF	articulated corallines	30	!	--	0
ROCKS	Lithothamnion sp.	80	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.8	1	1
ABALONE	.	2	12
ABALONE	.	3	1
ABALONE	1.9	4	0
ABALONE	.	5	1
ABALONE	.	6	1
ABALONE	.	7	1
ABALONE	.	8	0
ABALONE	.	9	1
ABALONE	.	10	1
ABALONE	.	11	0
ABALONE	.	12	3
ABALONE	.	13	1
ABALONE	.	14	2
ABALONE	.	15	1
ABALONE	.	16	2
SEA URCHIN (RED)	.	99	10 *

ABALONE SURVEY
MAY 1983

DIVING STATION LOG

VESSEL: Abiron SITE: 018 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Borrowman Bay

1983 MAY 23 (PST) TIME:START: 10:07 FINISH: 10:29

DEPTH FROM DATUM: MAX: 1.4 meters TIDE START: 3.8 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 10 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	10	!	--	0
BOTTOM	Hedophyllum sessile	10	!	--	0
TURF	articulated corallines	50	!	--	0
ROCKS	Lithothamnion sp.	70	!	--	0

REMARKS: Aborted - Target Species Absent

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.8	1	0
ABALONE	.	2	0
ABALONE	.	3	0
ABALONE	1.4	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
SEA URCHIN (RED)	.	8	0
	.	99	7 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 019 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Kettle Inlet

1983 MAY 23 (PST) TIME:START: 13:10 FINISH: 14:15

DEPTH FROM DATUM: MAX: 1.4 meters TIDE START: 3.2 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL. SLOPE: 10 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	80	!	--	0
BOTTOM	Laminaria sp.	70	!	Egregia menziesii	10
TURF	--	0	!	--	0
ROCKS	Lithothamnion sp.	50	!	articulated corallines	10

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.4	1	0
ABALONE	.	2	4
ABALONE	.	3	4
ABALONE	1.4	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	4
ABALONE	.	8	1
ABALONE	.	9	0
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	4
ABALONE	.	13	0
ABALONE	.	14	0
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	3 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 020 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 13

LOCATION: Kettle Inlet

1983 MAY 23 (PST) TIME:START: 14:45 FINISH: 15:40

DEPTH FROM DATUM: MAX: 1.5 meters TIDE START: 2.9 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: CBL./SND./SHL. SLOPE: 10 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	90	!	--	0
BOTTOM	Laminaria sp.	90	!	--	0
TURF	--	0	!	--	0
ROCKS	Lithothamnion sp.	50	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	.	1	0
ABALONE	.	2	0
ABALONE	.	3	0
ABALONE	1.5	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	1
ABALONE	.	9	1
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	2
ABALONE	.	14	0
ABALONE	.	15	0
ABALONE	.	16	2
SEA URCHIN (RED)	.	99	T *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 021 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 24 (PST) TIME:START: 09:00 FINISH: 09:48

DEPTH FROM DATUM: MAX: 1.2 meters TIDE START: 2.2 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	10	--	0
BOTTOM	Alaria sp.	10	Costaria sp.	10
TURF	articulated corallines	10	--	0
ROCKS	Lithothamnion sp.	90	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.1	1	1
ABALONE	.	2	1
ABALONE	.	3	0
ABALONE	1.2	4	2
ABALONE	.	5	2
ABALONE	.	6	3
ABALONE	.	7	7
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	1
ABALONE	.	11	1
ABALONE	.	12	0
ABALONE	.	13	2
ABALONE	.	14	1
ABALONE	.	15	0
ABALONE	.	16	2
SEA URCHIN (RED)	.	99	10 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 021 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 24 (PST) TIME:START: 09:00 FINISH: 09:48

DEPTH FROM DATUM: MAX: 1.2 meters TIDE START: 2.2 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	10	--	0
BOTTOM	Alaria sp.	10	Costaria sp.	10
TURF	articulated corallines	10	--	0
ROCKS	Lithothamnion sp.	90	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.1	1	1
ABALONE	.	2	1
ABALONE	.	3	0
ABALONE	1.2	4	2
ABALONE	.	5	2
ABALONE	.	6	3
ABALONE	.	7	7
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	1
ABALONE	.	11	1
ABALONE	.	12	0
ABALONE	.	13	2
ABALONE	.	14	1
ABALONE	.	15	0
ABALONE	.	16	2
SEA URCHIN (RED)	.	99	10 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 023 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 24 (PST) TIME:START: 13:19 FINISH: 14:09

DEPTH FROM DATUM: MAX: 1.3 meters TIDE START: 4.2 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./BLD. SLOPE: 30 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Alaria sp.	10	!	Nereocystis luetkeana	10
TURF	articulated corallines	50	!	Phyllospadix sp.	10
ROCKS	Lithothamnion sp.	60	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.5	1	8
ABALONE	.	2	6
ABALONE	.	3	0
ABALONE	1.3	4	2
ABALONE	.	5	7
ABALONE	.	6	7
ABALONE	.	7	0
ABALONE	.	8	1
ABALONE	.	9	0
ABALONE	.	10	1
ABALONE	.	11	1
ABALONE	.	12	0
ABALONE	.	13	5
ABALONE	.	14	2
ABALONE	.	15	1
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	10 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 024 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 24 (PST) TIME:START: 14:30 FINISH: 15:04

DEPTH FROM DATUM: MAX: 0.9 meters TIDE START: 3.4 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BLD./CBL./GRV./SHL. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	--	0	!	--	0
TURF	--	0	!	--	0
ROCKS	Lithothamnion sp.	70	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	.	1	2
ABALONE	.	2	3
ABALONE	.	3	0
ABALONE	.	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	1
ABALONE	.	9	0
ABALONE	.	10	0
ABALONE	.	11	2
ABALONE	.	12	0
ABALONE	.	13	1
ABALONE	.	14	1
ABALONE	.	15	1
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 025 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 25 (PST) TIME:START: 09:27 FINISH: 10:25

DEPTH FROM DATUM: MAX: 2.9 meters TIDE START: 1.7 meters

EXPOSURE: Strong Tidal Flows SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BLD./CBL./GRV./SHL. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	10	!	--	0
BOTTOM	Laminaria sp.	70	!	Nereocystis luetkeana	20
TURF	articulated corallines	40	!	--	0
ROCKS	Lithothamnion sp.	80	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	2.9	1	0
ABALONE	.	2	4
ABALONE	.	3	2
ABALONE	2.9	4	3
ABALONE	.	5	0
ABALONE	.	6	4
ABALONE	.	7	0
ABALONE	2.9	8	1
ABALONE	.	9	1
ABALONE	.	10	3
ABALONE	.	11	0
ABALONE	2.9	12	1
ABALONE	2.9	13	2
ABALONE	.	14	6
ABALONE	.	15	1
ABALONE	2.9	16	0
SEA URCHIN (RED)	.	99	15 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 026 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 26 (PST) TIME:START: 10:52 FINISH: 12:05

DEPTH FROM DATUM: MAX: 1.9 meters TIDE START: 2.7 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./GRV. SLOPE: 30 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	10	!	--	0
BOTTOM	Nereocystis luetkeana	60	!	Laminaria sp.	60
TURF	articulated corallines	30	!	--	0
ROCKS	Lithothamnion sp.	60	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT	
ABALONE	-0.6	1	14	
ABALONE	.	2	8	
ABALONE	.	3	29	
ABALONE	1.9	4	12	
ABALONE	.	5	9	
ABALONE	.	6	14	
ABALONE	.	7	8	
ABALONE	.	8	11	
ABALONE	.	9	1	
ABALONE	.	10	2	
ABALONE	.	11	13	
ABALONE	.	12	11	
ABALONE	.	13	10	*
ABALONE	.	14	10	*
ABALONE	.	15	8	
ABALONE	.	16	9	
SEA URCHIN (RED)	.	99	3	*

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 027 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 26 (PST) TIME:START: 09:10 FINISH: 10:15

DEPTH FROM DATUM: MAX: 2.2 meters TIDE START: 0.9 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: CBL./GRV. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	20	--	0
BOTTOM	Nereocystis luetkeana	10	Desmarestia sp.	10
TURF	Ulva sp.	50	Brown algae -cylindrical	20
ROCKS	Lithothamnion sp.	60	Diatoms - unkown	30

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	1.8	1	0
ABALONE	.	2	2
ABALONE	.	3	2
ABALONE	2.2	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	1
ABALONE	.	9	1
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	0
ABALONE	.	14	0
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	1 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 028 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 26 (PST) TIME:START: 10:45 FINISH: 11:45

DEPTH FROM DATUM: MAX: 1.9 meters TIDE START: 1.8 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./BLD. SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	--	0	--	0
BOTTOM	Laminaria sp.	60	Nereocystis luetkeana	10
TURF	Ulva sp.	20	articulated corallines	10
ROCKS	Lithothamnion sp.	70	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.5	1	0
ABALONE	.	2	1
ABALONE	.	3	0
ABALONE	1.9	4	0
ABALONE	.	5	1
ABALONE	.	6	0
ABALONE	.	7	1
ABALONE	.	8	1
ABALONE	.	9	6
ABALONE	.	10	7
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	0
ABALONE	.	14	4
ABALONE	.	15	3
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	1 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 029 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 26 (PST) TIME:START: 13:48 FINISH: 14:53

DEPTH FROM DATUM: MAX: 1.2 meters TIDE START: 4.4 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	20	--	0
BOTTOM	--	0	--	0
TURF	Laminaria sp.	20	Laminaria sp.	10
ROCKS	Lithothamnion sp.	60	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.7	1	3
ABALONE	.	2	0
ABALONE	.	3	0
ABALONE	1.2	4	0
ABALONE	.	5	1
ABALONE	.	6	8
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	2
ABALONE	.	10	5
ABALONE	.	11	3
ABALONE	.	12	0
ABALONE	.	13	5
ABALONE	.	14	5
ABALONE	.	15	1
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	10 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 030 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 27 (PST) TIME:START: 09:34 FINISH: 10:48

DEPTH FROM DATUM: MAX: 1.7 meters TIDE START: 1.0 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Laminaria sp.	70	!	--	0
TURF	Ulva sp.	10	!	--	0
ROCKS	Lithothamnion sp.	60	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.1	1	5
ABALONE	.	2	5
ABALONE	.	3	3
ABALONE	1.7	4	11
ABALONE	.	5	1
ABALONE	.	6	2
ABALONE	.	7	12
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	1
ABALONE	.	11	2
ABALONE	.	12	14
ABALONE	.	13	0
ABALONE	.	14	5
ABALONE	.	15	8
ABALONE	.	16	6
SEA URCHIN (RED)	.	99	2 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 031 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 27 (PST) TIME:START: 11:10 FINISH: 12:05

DEPTH FROM DATUM: MAX: 1.8 meters TIDE START: 3.1 meters

EXPOSURE: Ground Swell Normal SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 10 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	10	!	--	0
BOTTOM	Laminaria sp.	50	!	Laminaria sp.	10
TURF	Phyllospadix sp.	60	!	--	0
ROCKS	articulated corallines	90	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.6	1	3
ABALONE	.	2	0
ABALONE	.	3	2
ABALONE	1.8	4	0
ABALONE	.	5	5
ABALONE	.	6	1
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	1
ABALONE	.	11	1
ABALONE	.	12	2
ABALONE	.	13	0
ABALONE	.	14	0
ABALONE	.	15	4
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	T *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 032 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Hickey Island

1983 MAY 27 (PST) TIME:START: 14:28 FINISH: 15:28

DEPTH FROM DATUM: MAX: 5.0 meters TIDE START: 4.3 meters

EXPOSURE: Strong Tidal Flows SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: CBL./GRV. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	20	!	--	0
BOTTOM	Nereocystis luetkeana	30	!	Pleurophycus sp.	50
TURF	--	0	!	--	0
ROCKS	Lithothamnion sp.	50	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	5.0	1	6
ABALONE	5.0	2	6
ABALONE	5.0	3	0
ABALONE	5.0	4	0
ABALONE	5.0	5	4
ABALONE	5.0	6	3
ABALONE	5.0	7	5
ABALONE	5.0	8	4
ABALONE	5.0	9	0
ABALONE	5.0	10	5
ABALONE	5.0	11	5
ABALONE	5.0	12	4
ABALONE	5.0	13	9
ABALONE	5.0	14	3
ABALONE	5.0	15	2
ABALONE	5.0	16	6
SEA URCHIN (RED)	5.0	99	50 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 033 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Gillen Harbour

1983 MAY 28 (PST) TIME:START: 10:27 FINISH: 11:42

DEPTH FROM DATUM: MAX: 3.6 meters TIDE START: 1.0 meters

EXPOSURE: Moderate Exposure SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: CBL./SND./SHL. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	60	!	--	0
BOTTOM	Laminaria sp.	90	!	--	0
TURF	articulated corallines	40	!	--	0
ROCKS	Lithothamnion sp.	40	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	3.6	1	4
ABALONE	3.6	2	0
ABALONE	3.6	3	1
ABALONE	3.6	4	4
ABALONE	3.6	5	3
ABALONE	3.6	6	1
ABALONE	3.6	7	1
ABALONE	3.6	8	3
ABALONE	3.6	9	0
ABALONE	3.6	10	1
ABALONE	3.6	11	2
ABALONE	3.6	12	1
ABALONE	3.6	13	2
ABALONE	3.6	14	3
ABALONE	3.6	15	1
ABALONE	3.6	16	1
SEA URCHIN (RED)	.	99	2 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 034 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Gillen Harbour

1983 MAY 29 (PST) TIME:START: 09:30 FINISH: 10:38

DEPTH FROM DATUM: MAX: 1.0 meters TIDE START: 0.5 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	80	--	0
BOTTOM	Laminaria sp.	80	--	0
TURF	--	0	--	0
ROCKS	Lithothamnion sp.	50	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	.4	1	1
ABALONE	.	2	1
ABALONE	.	3	4
ABALONE	1.0	4	3
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	3
ABALONE	.	10	11
ABALONE	.	11	3
ABALONE	.	12	0
ABALONE	.	13	3
ABALONE	.	14	0
ABALONE	.	15	8
ABALONE	.	16	1
SEA URCHIN (RED)	.	99	T *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 035 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Gillen Harbour

1983 MAY 29 (PST) TIME:START: 11:02 FINISH: 12:00

DEPTH FROM DATUM: MAX: 2.4 meters TIDE START: 1.0 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 30 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Laminaria sp.	10	!	Phyllospadix sp.	10
TURF	--	0	!	--	0
ROCKS	--	0	!	articulated corallines	50

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.0	1	8
ABALONE	.	2	3
ABALONE	.	3	1
ABALONE	2.4	4	0
ABALONE	.	5	9
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	12
ABALONE	.	10	2
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	16
ABALONE	.	14	0
ABALONE	.	15	1
ABALONE	.	16	1
SEA URCHIN (RED)	.	99	3 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 036 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Gillen Harbour

1983 MAY 29 (PST) TIME:START: 14:09 FINISH: 15:23

DEPTH FROM DATUM: MAX: 2.2 meters TIDE START: 3.3 meters

EXPOSURE: Ground Swell Normal SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 30 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	--	0	!	--	0
BOTTOM	Alaria sp.	50	!	Phyllospadix sp.	20
TURF	articulated corallines	10	!	--	0
ROCKS	Lithothamnion sp.	40	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.9	1	0
ABALONE	.	2	4
ABALONE	.	3	0
ABALONE	2.2	4	0
ABALONE	.	5	2
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	10
ABALONE	.	10	2
ABALONE	.	11	1
ABALONE	.	12	0
ABALONE	.	13	1
ABALONE	.	14	3
ABALONE	.	15	3
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	15 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 037 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Gillen Harbour

1983 MAY 29 (PST) TIME:START: 15:47 FINISH: 16:54

DEPTH FROM DATUM: MAX: 1.6 meters TIDE START: 4.1 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(CRV) SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	20	!	Nereocystis luetkeana	10
BOTTOM	Alaria sp.	30	!	Laminaria sp.	10
TURF	articulated corallines	20	!	--	0
ROCKS	Lithothamnion sp.	40	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.5	1	1
ABALONE	.	2	4
ABALONE	.	3	3
ABALONE	1.6	4	1
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	2
ABALONE	.	8	1
ABALONE	.	9	2
ABALONE	.	10	2
ABALONE	.	11	3
ABALONE	.	12	5
ABALONE	.	13	4
ABALONE	.	14	7
ABALONE	.	15	2
ABALONE	.	16	2
SEA URCHIN (RED)	.	99	10 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 038 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Oswald Bay

1983 MAY 30 (PST) TIME:START: 11:11 FINISH: 12:20

DEPTH FROM DATUM: MAX: 2.0 meters TIDE START: 1.0 meters

EXPOSURE: Occasional Current SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BLD./CBL./GRV./SHL. SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	60	!	--	0
BOTTOM	Laminaria sp.	50	!	Alaria sp.	30
TURF	articulated corallines	10	!	Ulva sp.	10
ROCKS	Lithothamnion sp.	40	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	.	1	2
ABALONE	.	2	1
ABALONE	.	3	2
ABALONE	2.0	4	0
ABALONE	.	5	1
ABALONE	.	6	0
ABALONE	.	7	4
ABALONE	.	8	0
ABALONE	.	9	1
ABALONE	.	10	7
ABALONE	.	11	7
ABALONE	.	12	1
ABALONE	.	13	0
ABALONE	.	14	3
ABALONE	.	15	5
ABALONE	.	16	3
SEA URCHIN (RED)	.	99	T *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 039 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Oswald Bay

1983 MAY 30 (PST) TIME:START: 14:23 FINISH: 15:20

DEPTH FROM DATUM: MAX: 1.8 meters TIDE START: 2.8 meters

EXPOSURE: Ground Swell Normal SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK./CBL./SND./SHL. SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO	SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	10	Nereocystis luetkeana	20
BOTTOM	Laminaria sp.	20	--	0
TURF	articulated corallines	30	--	0
ROCKS	Codium fragile	10	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.1	1	9
ABALONE	.	2	10
ABALONE	.	3	13
ABALONE	1.8	4	0
ABALONE	.	5	1
ABALONE	.	6	3
ABALONE	.	7	2
ABALONE	.	8	0
ABALONE	.	9	3
ABALONE	.	10	4
ABALONE	.	11	1
ABALONE	.	12	1
ABALONE	.	13	3
ABALONE	.	14	11
ABALONE	.	15	5
ABALONE	.	16	2
SEA URCHIN (RED)	.	99	2 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 040 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Oswald Bay

1983 MAY 30 (PST) TIME:START: 15:35 FINISH: 16:42

DEPTH FROM DATUM: MAX: 1.2 meters TIDE START: 3.4 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BLD./CBL./GRV./SHL. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	50	!	--	0
BOTTOM	Laminaria sp.	30	!	--	0
TURF	--	0	!	--	0
ROCKS	Lithothamnion sp.	20	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	.3	1	2
ABALONE	.	2	0
ABALONE	.	3	0
ABALONE	1.2	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	1
ABALONE	.	9	2
ABALONE	.	10	1
ABALONE	.	11	0
ABALONE	.	12	2
ABALONE	.	13	1
ABALONE	.	14	0
ABALONE	.	15	1
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	2 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 041 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Oswald Bay

1983 MAY 31 (PST) TIME:START: 09:21 FINISH: 09:56

DEPTH FROM DATUM: MAX: 2.3 meters TIDE START: 1.4 meters

EXPOSURE: Ground Swell Normal SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 20 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Nereocystis luetkeana	40	!	--	0
BOTTOM	Desmarestia sp.	20	!	Phyllospadix sp.	30
TURF	--	0	!	--	0
ROCKS	Lithothamnion sp.	80	!	--	0

REMARKS: previous survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.2	1	5
ABALONE	.	2	4
ABALONE	.	3	1
ABALONE	2.3	4	0
ABALONE	.	5	2
ABALONE	.	6	0
ABALONE	.	7	0
ABALONE	.	8	0
ABALONE	.	9	2
ABALONE	.	10	0
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	1
ABALONE	.	14	0
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	4 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 042 DIVER: OOK

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Oswald Bay

1983 MAY 31 (PST) TIME:START: 10:15 FINISH: 10:55

DEPTH FROM DATUM: MAX: 0.6 meters TIDE START: 0.9 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: CBL. SLOPE: 00 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	90	!	--	0
BOTTOM	Laminaria sp.	80	!	--	0
TURF	articulated corallines	30	!	--	0
ROCKS	Lithothamnion sp.	30	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-0.9	1	0
ABALONE	.	2	0
ABALONE	.	3	1
ABALONE	.6	4	1
ABALONE	.	5	0
ABALONE	.	6	1
ABALONE	.	7	1
ABALONE	.	8	0
ABALONE	.	9	1
ABALONE	.	10	1
ABALONE	.	11	0
ABALONE	.	12	0
ABALONE	.	13	0
ABALONE	.	14	0
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	5 *

DIVING STATION LOG

ABALONE SURVEY
MAY 1983

VESSEL: Abiron SITE: 043 DIVER: OOW

FISHERIES STATISTICAL: region 0 area 06 sub-area 09

LOCATION: Oswald Bay

1983 MAY 31 (PST) TIME:START: 12:54 FINISH: 13:55

DEPTH FROM DATUM: MAX: 1.0 meters TIDE START: 1.5 meters

EXPOSURE: High Tide Surge Only SURVEY DESIGN: 16 quadrats (Breen)

SUBSTRATE TYPE: BRK.(SMO) SLOPE: 30 degrees

	DOMINANT ALGAE SPECIES NAME	%COVER UP TO		SPECIES NAME	%COVER UP TO
CANOPY	Macrocystis integrifolia	10	!	--	0
BOTTOM	Phyllospadix sp.	40	!	Laminaria sp.	20
TURF	articulated corallines	20	!	--	0
ROCKS	Lithothamnion sp.	80	!	--	0

REMARKS: New survey site

SPECIES NAME	DEPTH FROM DATUM	QUADRAT NUMBER	SPECIES COUNT
ABALONE	-1.0	1	3
ABALONE	.	2	1
ABALONE	.	3	0
ABALONE	1.0	4	0
ABALONE	.	5	0
ABALONE	.	6	0
ABALONE	.	7	2
ABALONE	.	8	0
ABALONE	.	9	0
ABALONE	.	10	0
ABALONE	.	11	1
ABALONE	.	12	0
ABALONE	.	13	0
ABALONE	.	14	1
ABALONE	.	15	0
ABALONE	.	16	0
SEA URCHIN (RED)	.	99	25 *